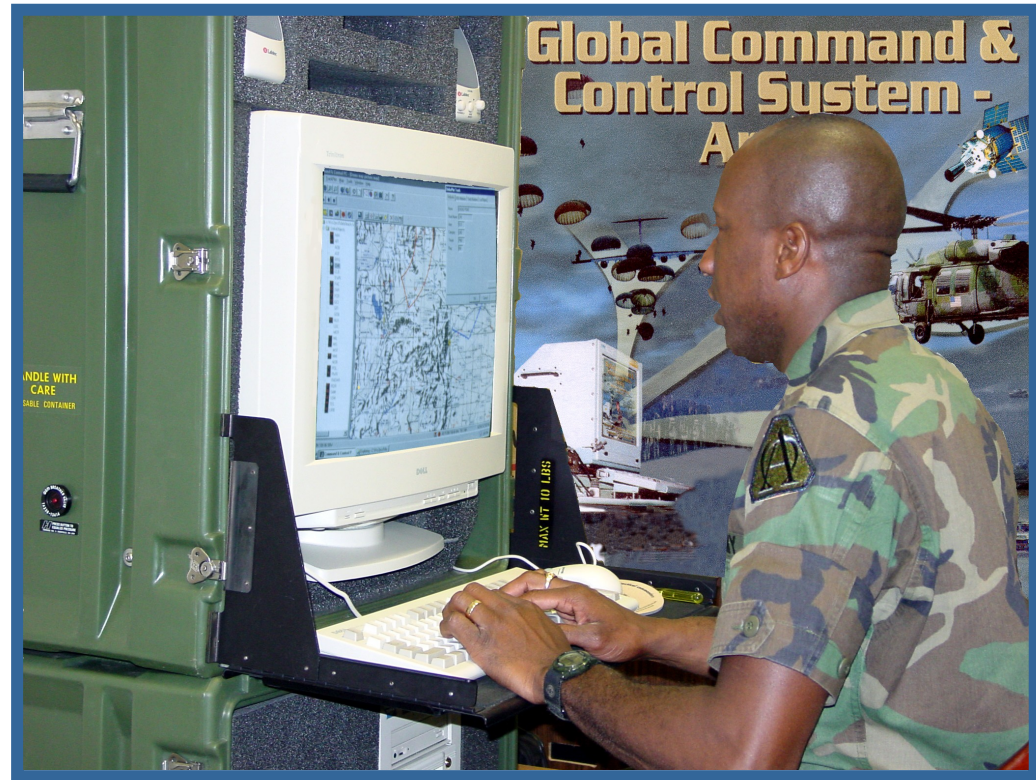




NETWORK CENTRIC ENTERPRISE SERVICES: THE NEXT GENERATION COE



Tim Wall
GCCS-A Chief Engineer
703-883-6927
twall@mitre.org

10 SEP 2002



PURPOSE

- **Provide the GCCS-A Users With an Overview of the Next Generation COE, Network Centric Enterprise Services (NCES), and the DISA Migration From COE to NCES**

P
M

G
C
C
S

I
A



AGENDA: COE AND NCES

- What's happening?
- Yesterday, Today, and Tomorrow
- How?
- Guiding Principles
- What is "NCES"?
- Multiple Views of the NCES Architecture
- NCES Schedule?



WHAT'S HAPPENING?

- **COE is transitioning to become ACAT-1 program**
- **COE is being transformed into the “Network Centric Enterprise Services” (NCES) Program**
 - **Accelerating the move to network centric architecture**
 - **Keeping the good concepts of COE**
 - **Addressing flaws of current platform-based solutions**
 - **Keeping pace with technology**
- **COE 4.x will be:**
 - **Supported for systems planning to field on it**
 - › **COE 4.x will likely be in the field for 3-4 years**
 - **Foundational element of NCES Version 1.X**
 - › **Selected components of COE 4.x will be brought forward**



C3I/CIO GOALS FOR NET-CENTRIC DOD

- **Make information available on a network that people depend on and trust**
- **Populate the network with new, dynamic sources of information to defeat the enemy**
- **Deny the enemy advantages and exploit weakness**

P
M

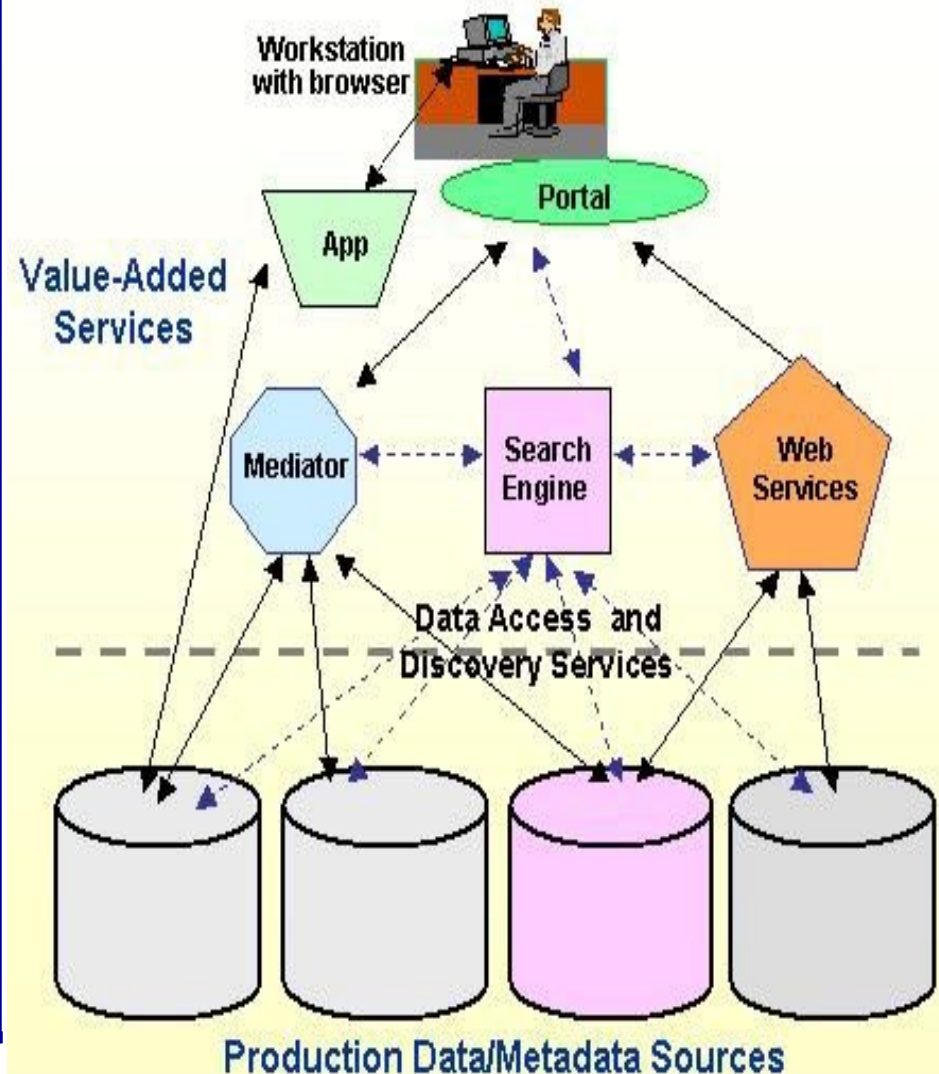
G
C
C
S
-
A



NETWORK CENTRIC ENTERPRISE SERVICES

“Power to the Edge”

- Web Services as Enabler
- Tactical User Support (e.g., Peer-to-Peer)
- Plug-and-Play Components and Capabilities
- Rapid Integration and Fielding of Capabilities
- Robust Data Exchange
- Publish and Subscribe Capabilities
- Assurance of Availability (i.e., Application QoS)
- Security Infrastructure
- Support for Joint Task Forces, FIOP, Deployable Joint C2 and other DoD Initiatives

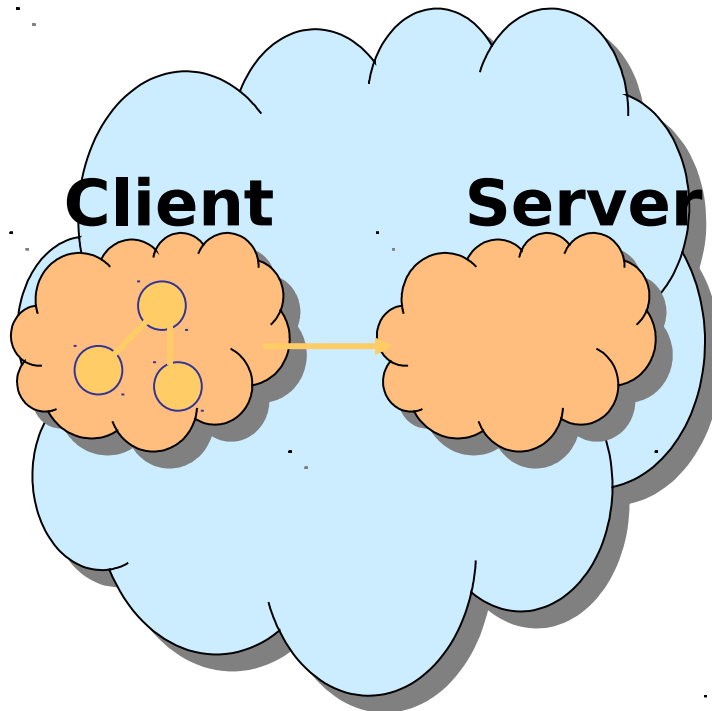




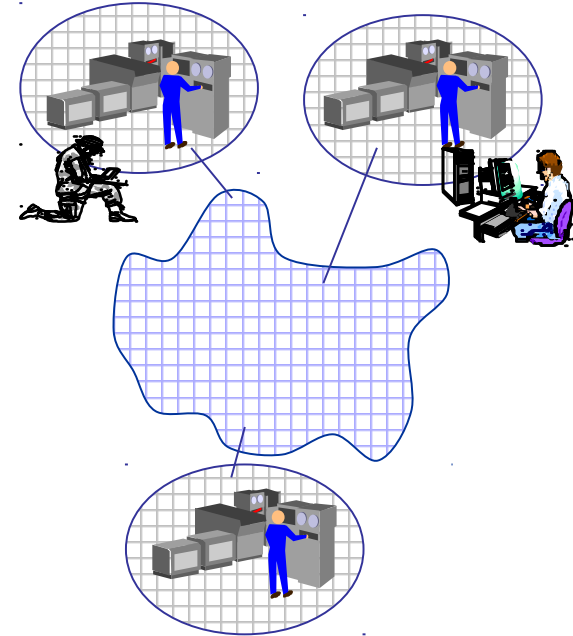
COE YESTERDAY (OPERATIONAL TODAY)

COE 3.x

Legacy



=



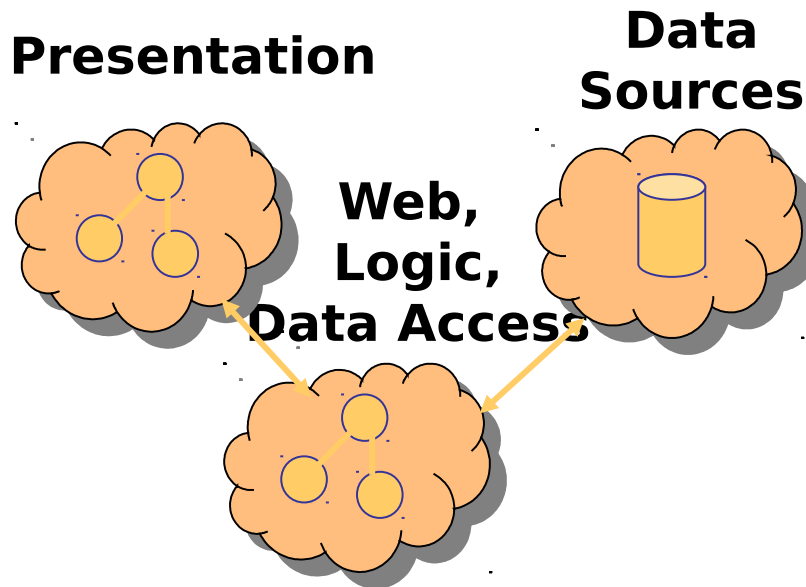
NETWORK CONNECTIONS

- ***BUT*** no network visibility or access services
- Different directories, security, access processes etc.
- Different data representations
- Numerous uncoordinated Transformations
- Data filtered by local system (e.g., JTAV and JOPES show different data from GTN different from GTN directly)



COE PRODUCTION TODAY

COE 4.x



Server side components and containers,
N-tiered, Web-enabled,
robust Metadata Services

NETWORK CONNECTIONS

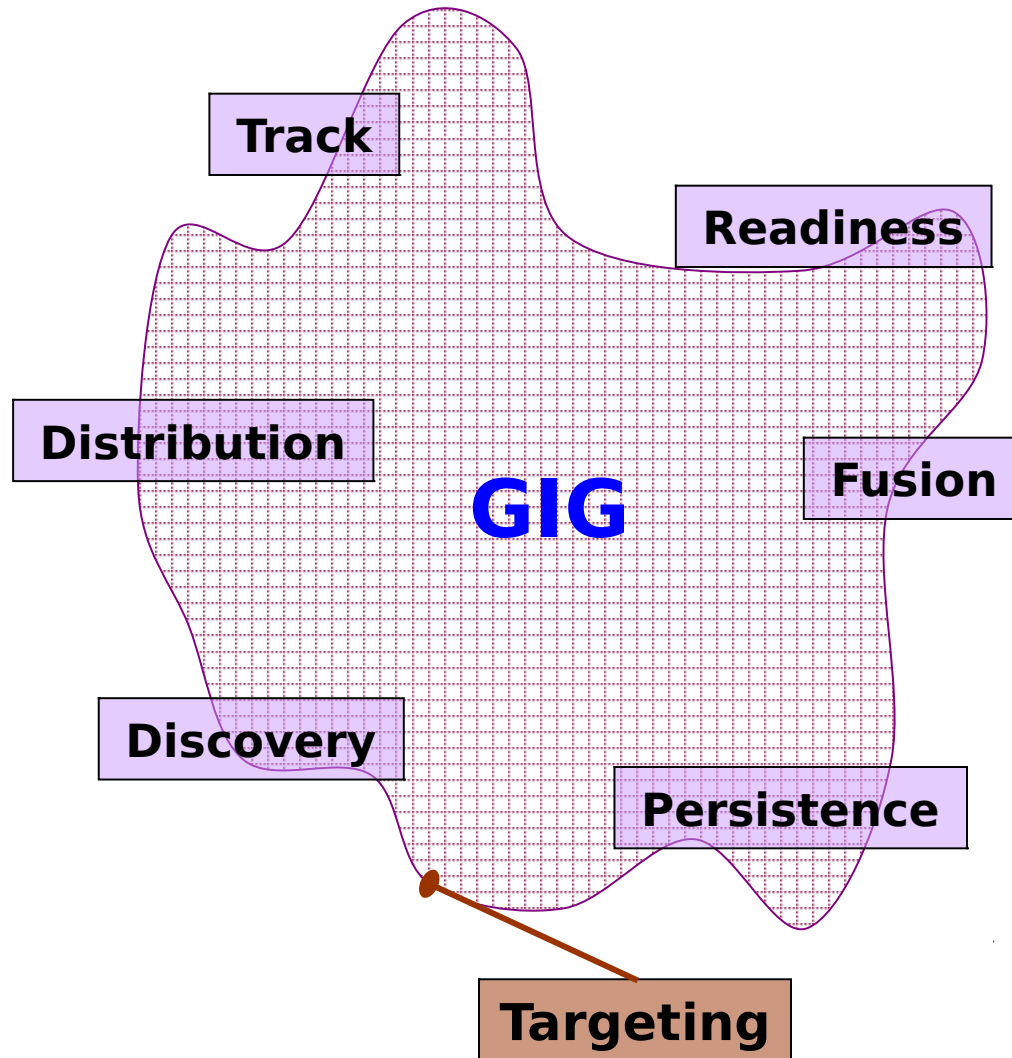
- *Still Primarily System Focused*
- Some network visibility & access to services
- Different directories, security, access processes etc.
- Different data representations
- Some coordinated Transformations
- Data filtered by local systems, some cached data available to multiple users



P
M
GCCS-A

NCES OF TOMORROW (FORMERLY, COE 5.X)

Network Centric Enterprise Services





HOW ?

- **Refocus COE activities and apply resources to enterprise services**
- **Bridge legacy systems to enterprise services**
- **Incrementally implement NCES functionally**
 - **Initially scale the enterprise services to C2 and combat support communities by expanding on the capabilities of current COE foundation/systems**
 - **Prove publish/subscribe approach using C2/CS information publishers and subscribers**
 - **Establish architectural guidance for information publishers and builders of NCES**
 - **Provide transition path for current COE based systems to take advantage of new capabilities and to migrate from platform centric to network centric**



HOW (CONCLUDED)?

- **Bring forward proven benefits of COE process**
 - Continue to facilitate software integration of components from multiple sources
 - Continue to facilitate interoperability through common software implementations (e.g. software reuse)
- **Refocus legacy requirements**
 - Eliminate requirement for COTS re-packaging
 - Eliminate requirement for GOTS installer
 - Reduce need for government management of COTS/GOTS software repositories
 - Maintain architectural compatibility



GUIDING PRINCIPLES

- **Protect legacy mission application investment**
- **Maintain peaceful coexistence and software reuse as fundamental NCES objectives**
- **Focus on joint warfighter needs**
- **Users should be able to find and access the information they need**
- **Make enterprise infrastructure services small in number, well-defined, and stable**
- **Ensure that NCES services are implementable and secure**



GUIDING PRINCIPLES (CONCLUDED)

- **Consider that incremental upgrades/evolution will be the norm**
- **Support the needs of program managers and developers**
- **Design and develop NCES software using a community process**
- **Data interoperability between current COE- and NCES-based systems**

P
M

G
C
C
S

A



NCES WILL PROVIDE...

- **Enterprise Infrastructure**
 - Ubiquitous services across enterprise, network-accessible, independent of domain
- **C2 Enterprise Services**
 - Applicable across C2 COIs, network-accessible, nodes can produce and promote
- **Reusable Software**
 - Common software components, focused on C2 COIs, promotes interoperability and cost savings
- **Build-Time Services and Software**
 - Used by developers, doesn't need to be available at run-time, promotes integration and interoperability



DEFINITIONS

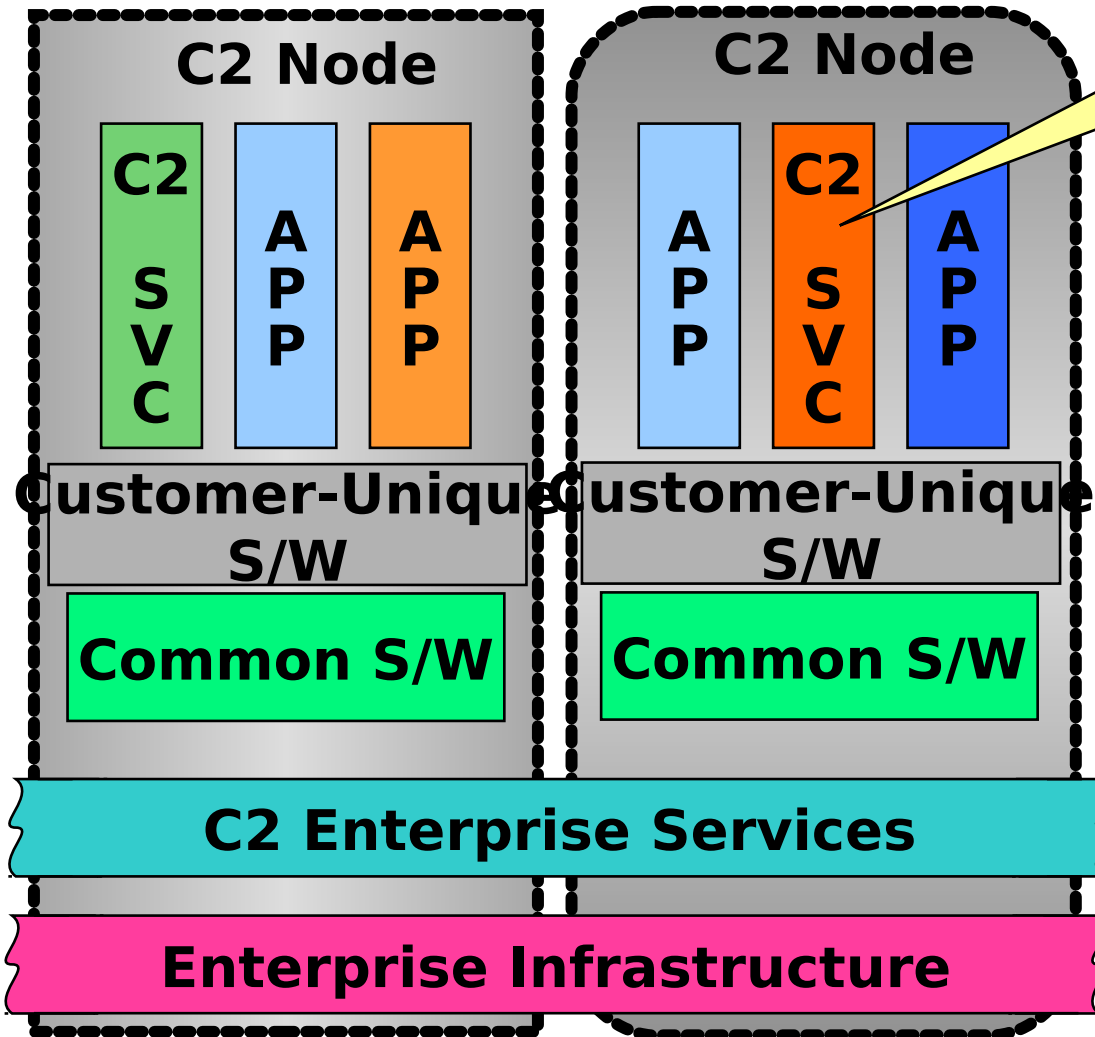
- **Capability** - functionality provided to the warfighter
 - Expressed in warfighter terms, not in technical nor in system terms
- **Service** - software and data required to support capabilities
 - One capability may require many services
 - One service may support many capabilities
- **System** - a specific collection of capabilities as currently fielded
 - All systems are legacy
- **Warfighter-centric, network enabled**
 - “Network-centric” places the emphasis in the wrong place (on the technology)
 - Warfighter is central, not a system, technology, or even

Field capabilities, *not* systems



P
M
G
C
C
S
A

NCES DECOMPOSITION



Mission applications
can provided
services

System developed
Software/Application

NCES provided
Software/Services



KEY ELEMENTS OF NCES

• Network-Centric Enterprise Services

- Network Services that Meet C2 QoS Requirements
- Enterprise Security to Protect the Enterprise
- C2 Specific Enterprise Services
- Lookup (Brokering) of Information & Providers
- Transport for Robust Sharing Information

• Information Publishers (Producers)

- Post raw and processed information
- Provide value-added enterprise services
 - › E.g., Filtering, Fusion, Correlation, Analysis

• Information Subscribers (Consumers)

- Access to Information Throughout the Enterprise using tools within the Infrastructure
- No special client-side (edge user) requirements



P
M

G
C
C
S
-
A

GIG Architecture



NCES SERVICES

COMMUNICATIONS

Communications Transport

- e.g., VPN

Network Management Services

- e.g., IP sharing, IP domains

Voice

Voice over IP

INFORMATION ASSURANCE

Identify Management

- e.g., Authentication

Key Management Infrastructure

- e.g., Distribution, Control of keys

Discretionary Access Control

Auditing

Encryption

INFORMATION DISTRIBUTION

Transport Mechanisms

- e.g., Messaging

Content Mechanisms

- e.g., Publish/Subscribe, Collaboration

COMPUTING & NETWORK MGMT

Health & Performance

- e.g., Service status, Metrics

Mgmt of Local Comm Network

- e.g., Bandwidth mgmt, DNS

Network Time

- e.g., Network Time Protocol

INFORMATION MGMT FUNCTIONS

Archival Services

Geographic Information Services

Information Modeling

- e.g., Mediation, Interdomain translation

Registry Services

Discovery Services

Common Operational Picture

PLATFORM APPLICATIONS

Quality of Service

Security Configuration Templates

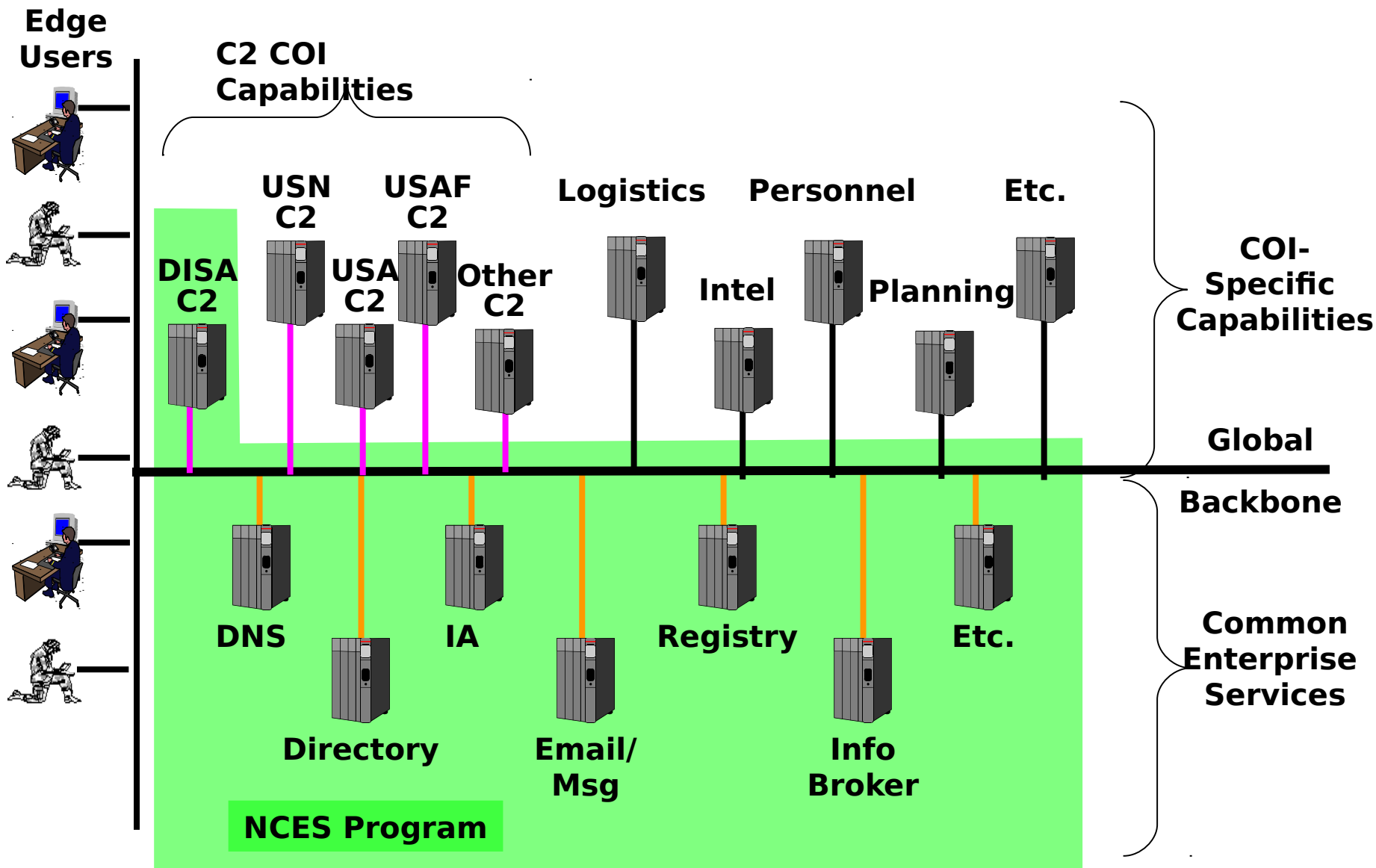
Client Software



ARCHITECTURE VISION - CUT TO THE CHASE



P
M
GCCS
A





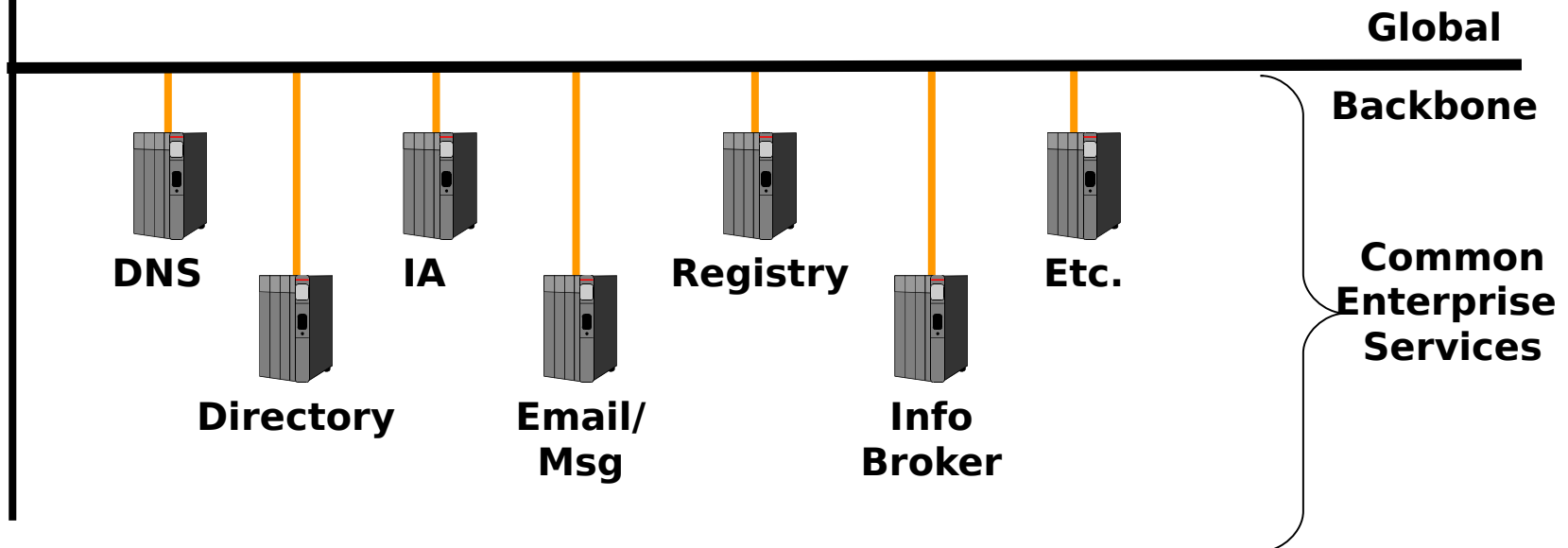
NCES ARCHITECTURE: COMMON ENTERPRISE SERVICES

Purpose

- Establish Connectivity
- Establish a Secure Environment
 - Defense-in-Depth
- Establish a producer/consumer marketplace
 - make what I have available
 - find what I want, and just what I want

Attributes

- IP Addressable
- Domain Independent
- Mostly COTS
- Replicated pattern to lower level su

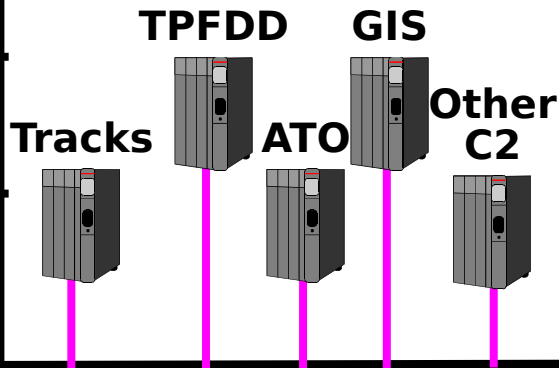




NCES ARCHITECTURE: COE-SPECIFIC CAPABILITIES (C2 EXAMPLE)

P
M
G
C
C
S
-
A

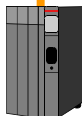
Edge Users



DNS



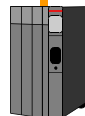
Directory



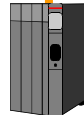
IA



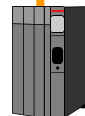
Email/
Msg



Registry



Info
Broker



Etc.

Global

Backbone

Common
Enterprise
Services

Purpose

- Commonly used COI Capabilities and data

Attributes

- Built on top of CES
- Data & Business Logic only
 - no visualization
- 1 to N providers
- I/F to CES is what is important
 - notion of CES compliance is required

Note that this is also a migration strategy!



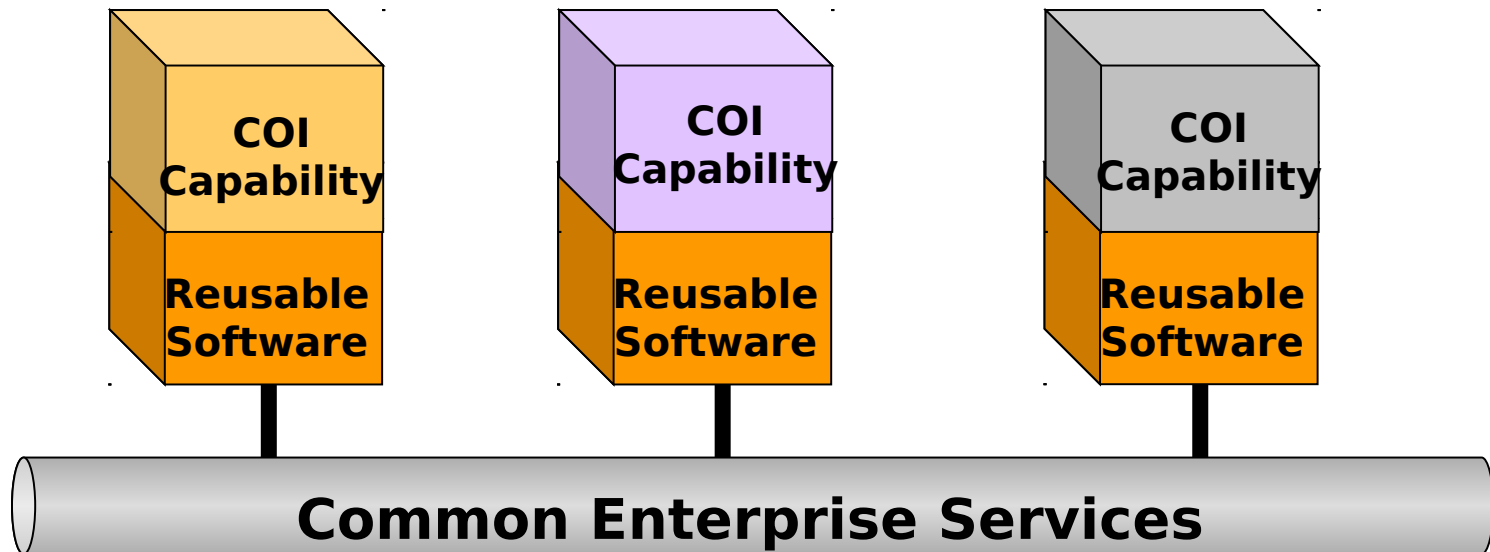
NCES ARCHITECTURE: PLATFORM ARCHITECTURE

Purpose

- S/W Reuse
- Facilitate Interoperability
- Promote Application Sharing
- Runtime Integration

Attributes

- Needed for “non-stovepipe” capabilities
- Solves “80%” of integration problems
- Platform level “Plug ‘n Play”
- No repackaging of COTS products





DISA PRODUCTS & SERVICES

Technical Architecture

- Network Standards
- Security Standards
- Run-Time Standards (J2EE / .NET)
- Web-Services Standards (WSDL, SOAP, UDDI)
- Joint C2 Data Standards

Service Provider

- WAN Networks
- Network Services
- Enterprise Support Services
- Joint C2 Services
- Joint C2 Platforms (service hosting)
- Electronic Commerce Services



DISA PROVIDED SERVICES (EXAMPLE)

P
M

G
C
C
S

I
A

Joint C2 Services

DISA
Mission
Areas

Joint C2

Joint CS

Aligned
with
Commercial
Enterprise-
Model

C2 Enterprise
& Platform
Services

Info
Managemen
t

Collaboration

Data
Services

ASP
Services
• App Servers
• Web Servers

ASP

Common
Enterprise
Services

Directory
Services

QoS Services

Security
Services

Monitoring
Services

ISP

Wide-Area
Networks

SIPRNET

NIPRNET

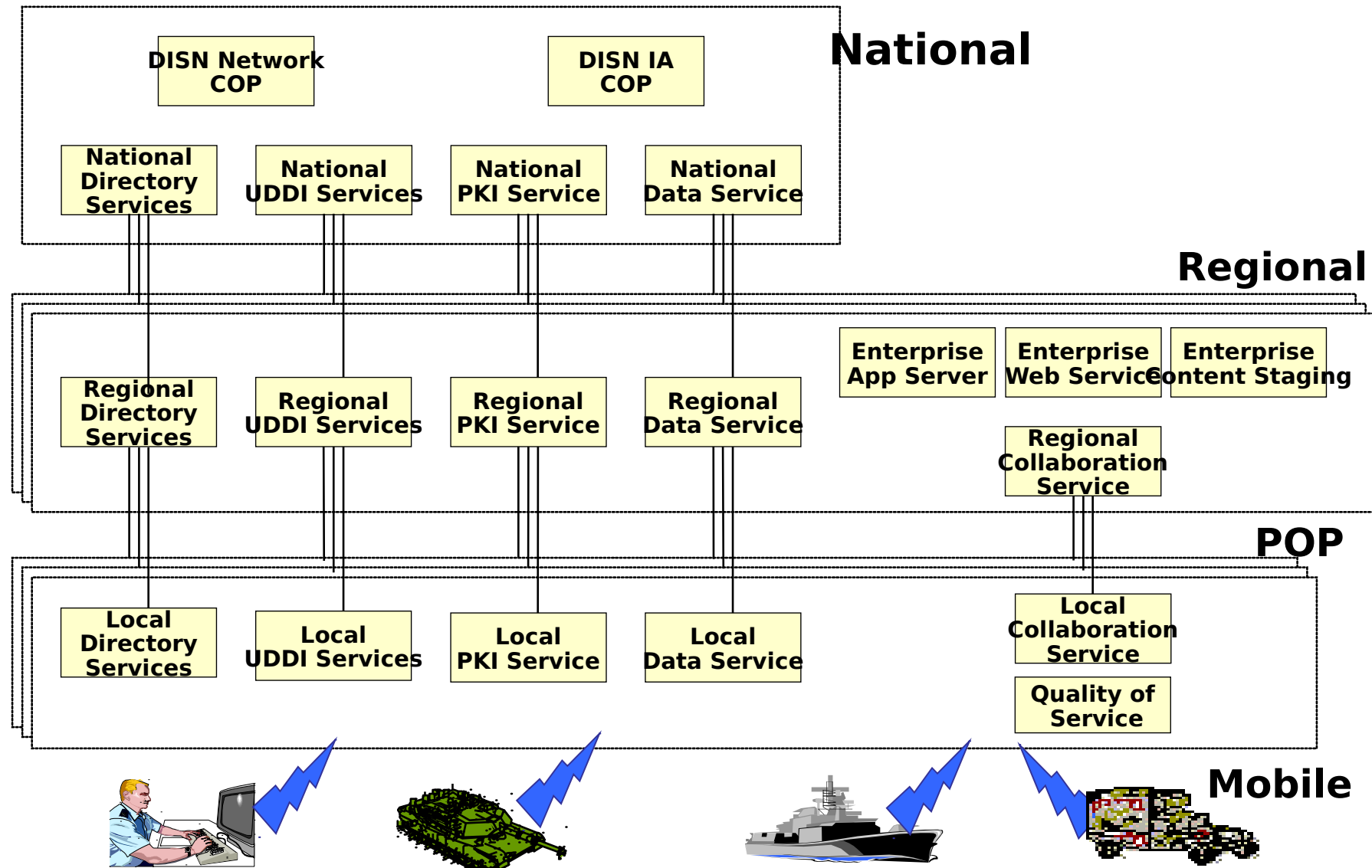
CWAN



ENTERPRISE DEPLOYMENT ARCHITECTURE

P
M
G
S
A

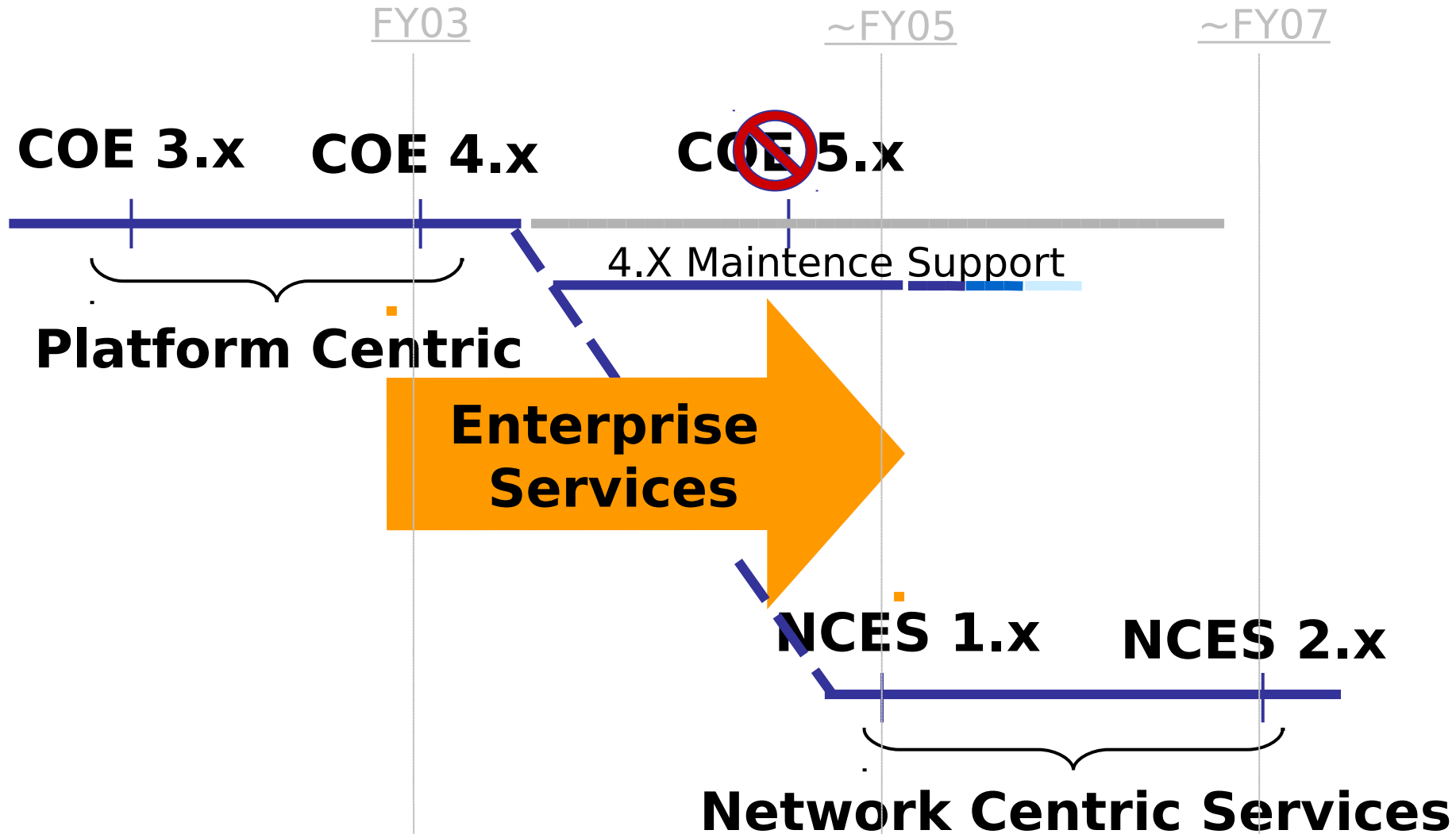
Strategic
Fixed
Tactical
Deployed





P
M
GCCS
A

WHEN?





NEXT STEPS/ACTIONS

- **Decompose legacy systems into capabilities or candidate C2 enterprise services**
 - i.e., ATO, JOPES, TPFDD, MIDB, NIMA data, Imagery, Situational Awareness data, METOC, etc.
- **Timeline and populate the CES based on services needed from #1**
- **Define I/F between capability and CES**
- **Define compliance criteria**
 - NCES compliance
 - Security compliance
 - Platform compliance (as required)
- **Certification & Accreditation Process for services vice systems**



SUMMARY

- **NCES Empowers the Warfighter Through Information Availability Across the Enterprise**
 - Leverage Technology to Rapidly Expand Warfighters' Knowledge Base through Ubiquitous Information Availability
 - Provide Enterprise Services That Support Rapidly Evolving Operational Scenario
- **Revolution with Evolution Ensures Rapid Transition While Protecting Current Investments**
 - Revolutionary Approach Provides Early Enterprise Information Availability
 - Evolutionary Approach Ensures Ever-Increasing Capabilities With a seamless migration from COE to NCES
- **Enterprise Infrastructure Establishes the Foundation**
 - Built on the Global Information Grid
 - Provides the Quality of Service Demanded by Fixed, Deployable, and Mobile Warfighters Worldwide Operating in Both Connected and Disconnected Modes
 - Hierarchical Architecture ensures Operations Gracefully Degrade When Connectivity Impacts Occur